REMARKS

I.   Introduction

Claims 1, 3-8, and 18-25 stand rejected under a combination of references. The claims are not obvious for two reasons. First, the claimed invention shows unexpectedly superior results in tests for the performance of turf reinforcement mats. Second, there are four elements that are not taught by any of the pending prior art references. For these reasons, Applicant respectfully requests a Notice of Allowance.

Claim number 22 was skipped in the last amendment. That claim has been annotated as "Not Entered." Claims 1 and 18 have been amended to address typographical issues. Claims 27, 28, and 29 are new, and include the limitations of claims 1, 3-8, and 18.

II.   Applicant's Claimed Turf Replacement Mat is Not Obvious Because the Claimed Invention Demonstrates Unexpectedly Superior Results

The contribution of the Martin reference to the combinations is the use of tri-lobe fiber. Martin does not suggest the unexpectedly superior results achieved with tri-lobe strands as compared to other fibers or strands. So it fails to provide any motivation to achieve the claimed invention.

The Federal Circuit in *Proctor & Gamble v Teva Pharmaceuticals USA, Inc.* noted that a patent owner may rebut prima facie obviousness by showing the claimed invention exhibits some superior property or advantage that a person of ordinary skill in the relevant art would have found surprising or unexpected. 566 F.3d 89, 994 (Fed. Cir. 2009) (Attached to November 13, 2009 Amendment). Presence of a property not possessed by the prior art is evidence of nonobviousness. *In re Papesch*, 315 F.2d 381, 137 U.S.P.Q. 43 (CCPA 1963). Without admitting the existence of a prima facie case, Applicant will show that the claimed fiber shape provides superior results, and also show that this result is unexpected.

A. Applicant's Claimed Turf Replacement Mat Made with Tri-Lobe Strands Demonstrates an Unexpected Result-Effective Variable

The invention of Applicant's claims selects tri-lobal strands from a number of fiber configurations known in the prior art. The dependent claims address specific variables that further narrow the selected tri-lobal configuration. Claim 27 includes all of these limitations. Further, Applicant's tests show the claimed fiber configuration is a result-effective variable. The prior art does not teach that the geometry of the strands is a known result-effective variable, and therefore the superior results shown above are unexpected.

The MPEP specifically requires at section 2144.05 that for a superior result to qualify as an obvious variable as an optimization, a particular parameter must first be recognized as a result-effective variable. An applicant can rebut a prima facie case of obviousness based on overlapping ranges by showing the criticality of the claimed range. MPEP § 2144.05. "The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims... in such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range." See MPEP § 716.02. An applicant can rebut a presumption of obviousness based on a claimed invention that falls within a prior art range by showing "(1) that the prior art taught away from the claimed invention... or (2) that there are new and unexpected results relative to the prior art." *Iron Grip Barbell Co., Inc. v. USA Sports, Inc.*, 392 F.3d 1317, 1322, 73 U.S.P.Q.2d 1225, 1228 (Fed. Cir. 2004).

The present application is analogous to the situation in a case cited in the MPEP, *In re Antonie*, 559 F.2d 618 (CCPA 1997). In *Antonie*, the prior art did not recognize that wastewater treatment capacity is a function of tank volume to contract ratio. The claimed ratio of 0.12 for tank volume to contract area was held to be non-obvious. Analogously, in the present case, the

prior art does not recognize that the parameter, shape of the fiber, is a result-effective variable. Therefore, Applicant's claimed parameter, a tri-lobe fiber having a particular geometry, is non-obvious.

i.   The Martin Reference Teaches a Broad List of Examples

Martin includes eleven figures of possible cross section shapes, only one having tri-lobe structure. The Martin reference Figures 7-17 discloses various cross section shapes including eight (8) round, one oval, one rectangular, and one tri-lobe. Figures 7 to 14 are schematic cross-sections of side-by-side multicomponent filaments of the Martin invention, and Figures 15 to 17 are schematic cross-sections of side-by-side multicomponent filaments of the Martin invention.

Fig. 7   Fig. 8

Fig. 9   Fig. 10

Fig. 11   Fig. 12   Fig. 13   Fig. 14

Fig. 15   Fig. 16   Fig. 17
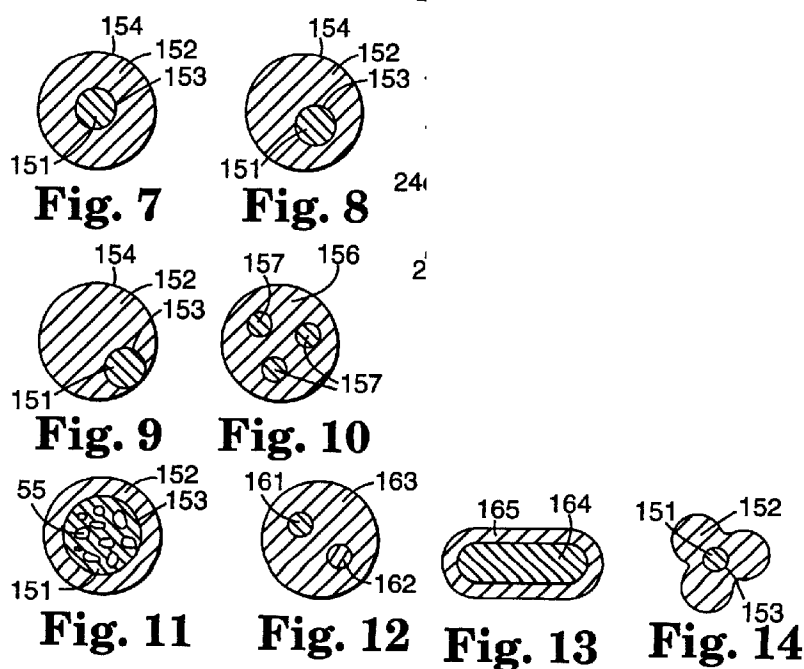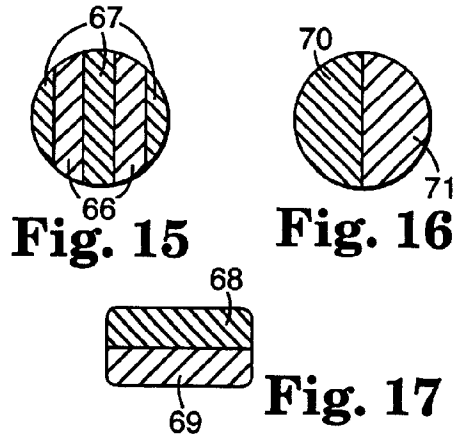
ii.   Martin Fails to Teach or Suggest Any One Shape is Preferred

Martin does not disclose superior performance for tri-lobe strands in a turf reinforcement mat. Martin is silent on which of the eleven figures of possible cross section shapes is preferred. To establish prima facie obviousness, it remains necessary to identify some supportable reason that would lead a person to make the asserted modification. See *Proctor & Gamble v Teva Pharmaceuticals USA, Inc.*, 566 F.3d at 994. Martin fails to suggest a preference for any specific shape, much less the tri-lobe shape. According to Martin,

> In a typical sheath-core filament... the filaments can be ... circular or round in cross-section or non-circular or odd in cross-section, e.g., lobal, elliptical, rectangular and triangular.

See Col. 5, lines 19-27.

Martin discloses nineteen (19) examples to demonstrate the invention. Martin uses the round cross section filaments in all examples, except example 9, which shows a rectangular cross section. Martin fails to suggest any significance of a tri-lobe structure to a single lobe structure. None of the prior art renders that the superior results achieve were predictable or that there is a supportable reason that a person of skill would make the claimed modification.

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B. Applicant's Turf Replacement Mat Made with Tri-Lobe Strands is Superior to an Equivalent Mat Made with Single-Lobe Strands

The test results, set forth in the application, disclose the superiority of the mat having tri-lobe strands. The Application includes several sets of test data to show that a composite turf reinforcement mat with a specific type of tri-lobe monofilaments (Sample B) displays improved performance compared to an analogous turf reinforcement mat with round monofilaments (Sample A).

i.   Seed Germination

The germination tests demonstrate the claimed invention construction exhibits unexpected improvement in seed germination rate per unit area. Table I and paragraphs [0043] through [0045] describe results of seed germination.

Table I
Germination Testing

First Round of Test

Property	Units	Day	Control	Sample B	Sample A
Seeds germinated per area	# per 4 sq. in. area	21	1.1	11.8	6.9
Average pit height	inch	21	0.4	2.2	1.9
Plant mass per area	mg per 4 sq. in.	21	1	10.7	9.9

Second Round of Test

Property	Units	Day	Control	Sample B	Sample A
Seeds germinated per area	# per 4 sq. in. area	14	1.8	10.7	10.7
		21	4.9	13.1	10.9
Average pit height	inch	14	1.7	3.3	2.3
		21	2.3	3.6	3.4
Plant mass per area	mg per 4 sq. in.	21	7.6	17.7	18.7

Third Round of Test

Property	Units	Day	Control	Sample B	Sample A
Seeds germinated per area	# per 4 sq. in. area	14	3.8	13.7	12.6
		21	3.9	14.7	14.3
Average pit height	inch	14	1.5	2.4	2.6
		21	1.8	3.2	3.3
Plant mass per area	mg per 4 sq. in.	21	10.6	31.6	28.6

In the first round of tests, after 21 days, the tri-lobe monofilament (Sample B) showed a 71% seed germination improvement.   In the second round of tests, the tri-lobe monofilament showed a 20% seed germination improvement. Finally, after 14 days, in the third round of tests, the tri-lobe monofilament showed 9% seed germination improvement.

The claimed invention exhibits unexpected results in pit height. For average pit height, in the first test, the tri-lobe monofilament demonstrated a 16% improvement. In the second test, average pit height improvement of 16%. After 14 days in the second test, the average pit height improved 43%, and after 21 days, 6%.

The claimed invention demonstrated a 10% improvement of plant mass per area in the third set of testing after 21 days.

     ii.   Soil Loss Ratio

The Soil Loss Ratio tests demonstrate the clamed invention construction exhibits unexpected improvement in the resiliency of the tri-lobe monofilament mat. See Table III, page 14.

Table III

Resiliency

Property	Units	Sample B	Sample A
First round of test	%	93	82
Second round of test	%	87	78

Property		Sample B	Sample A
Soil Loss	SLR	0.14	0.15

Table III describes the results from testing the resiliency and soil loss ratio. The claimed invention exhibits a 7% less soil loss. According to Table III, the tri-lobe monofilament in the first round demonstrated an 11% change from the single lobe structure. In the second round of testing, the tri-lobe monofilament demonstrated a 9% change from the single lobe structure. This data shows that the tri-lobe monofilament has a superior unexpected ability compared to the single lobe monofilament to prevent soil loss.

     iii.   Resistance to Shear-Induced Erosion Results

The claimed invention exhibits a 6% improved shear stress. See Table IV, paragraph [0052]. The tri-lobe monofilament demonstrated 6.4 permissible shear compared to 6.8 for the single lobe structure.

Table IV

Erosion Testing

Test	Tested Materials	Test Parameters	Test Results
Shear-induced Erosion	Sample B	Silty-sand; 65-70% Vegetated	$tp = 6.4$ psf
	Sample A	Silty-sand; 65-70% Vegetated	$tp = 6.8$ psf

(Key: tp = permissible shear)

The improved performance of Applicants' claimed invention in relation to standard tests for turf reinforcement mats are unexpected advantages in view of the prior art.

C. Applicant Correctly Elected Single-Lobe Strands as the Closest Prior Art

Applicant has correctly compared the claimed invention to the closest prior art, the single lobe fiber turf reinforcement mat. Evidence of unexpected properties may be in the form of a direct or indirect comparison of the claimed invention with the closest prior art which is commensurate in scope with the claims. MPEP § 716.02(d) - § 716.02(e). See *In re Blondel*, 499 F.2d 1311, 1317, 182 USPQ 294, 298 (CCPA 1974) and *In re Fouche*, 439 F.2d 1237, 1241-42, 169 USPQ 429, 433 (CCPA 1971) for examples of cases where indirect comparative testing was found sufficient to rebut a prima facie case of obviousness. Applicants may compare the claimed invention with prior art that is more closely related to the invention than the prior art relied upon by the examiner. MPEP 716.02(e)(I.).

The Applicant submitted with this response a declaration prepared pursuant to 37 C.F.R. §1.132. As sated in the MPEP 716.02(e), "An affidavit or declaration under 37 C.F.R. §1.132 must compare the claimed subject matter with the closest prior art to be effective to rebut a prima facie case of obviousness." *In re Burckel*, 592 F.2d 1175, 201 U.S.P.Q. 67 (CCPA). Further,

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MPEP 716.02(e)(I) states, "Applicants may compare the claimed invention with prior art that is more closely related to the invention than the prior art relied upon by the examiner." *In re Holladay*, 584 F.2d 384, 199 U.S.P.Q. 516 (CCPA 1978); *Ex Parte Humber*, 217 U.S.P.Q. 265 (Bd. App. 1961). Affiant, Derek Bass, affirms the claimed invention is compared to the closest prior art. In particular Applicant refers to Figure 1 that shows the configurations of the competing configurations. Sample B is clearly closer to Sample A in configuration than the 3M mat. This is confirmed at paragraph 22 of the declaration on page 9.

The turf reinforcement mat with the structure closest to the Applicant's invention is Applicants' own LandLok® 450. The LandLok® 450 has round strands. Aside from the cross section shape of the monofilaments in the center of the composite, the structures of that turf reinforcement mat and the composite that is the subject of this application are the same. Both the claimed invention and LandLok® weigh 10 ounces per square yard (0.3 kg/m²).

The Specification compares a turf reinforcement mat having tri-lobe strands of the present claims, sample B, against the LandLok® turf reinforcement mat having round monofilament strands, sample A. See page 10, lines 14-24. Sample A, the LandLok® is a commercially available round monofilament turf reinforcement mat. Apart from the strands, Sample A has exactly the same construction as the claimed mat, sample B.

Testing against anything other than single-lobe strands is not suggested by the prior art or commercial practice. Applicants are unaware of any non-single-lobe strands being used commercially. The single-lobe was chosen because of its availability, and the dominance of its use. On the other hand, there is no suggestion in the prior art or commercially to test anything other than single-lobe strands as a standard. Accordingly, the single-lobe fiber already tested is the appropriate material to test.

III.   Two Elements Are Not Taught By Any of the Applied References.

One skilled in the art appreciates at least four differences between Martin and the current invention. First, dependent claims 28-30 specifically claim drawn fibers. Martin's filaments are undrawn. Martin, in the summary of the invention, states, "This invention, in one aspect, provides undrawn, tough, durably melt-bonded…." (Col. 3, lines 52-55). The current invention is described as, "The fiber is then drawn into the oven at temperatures of 280 +/-3° C. and draw ration of 6.5/1" (Para. [0027], lines 10-12).

Second, Martin's filaments are continuous unlike independent claims 1, 18 and 27 where the filaments are cut into individual strands. Martin directs the preferable filaments

> … are melt-extruded as a bundle or group of free falling, closely spaced, generally parallel, *discrete, continuous, multicomponent filaments* of hot, tacky, deformable, viscous polymer melts for example, as sheath-core bicomponent strands, the hot filaments than being quickly cooled, or quenched, to a non-tacky or non-adhesive solid state.

Col. 7, lines 25-31.

The pending claims use:

> In a secondary process, the fiber from several packages forms a toe line that is fed through a mechanical crimper and cutter. The crimp box pressure is set at 0.5+/- bar and cutting wheel spacing of 4.6 inches (11.68 cm). In the practice of this invention, the *individual polymer strands* are cut to a length of from about 2 inches (5 cm) to about 12 inches (30 cm), with from about 3 inches (7.6 cm) to about 7 inches (17.8 cm) being preferred.

(Para [0028], lines 1-8).

This analysis is supported by the Bass Declaration. Paragraph 22 of the Bass Declaration on page 9 shows a picture of the fiber components of a 3M product.
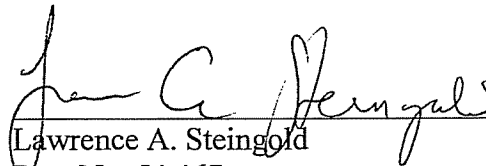
IV.   Conclusion.

Applicant has demonstrated both unexpected superior results and elements that are not contained in the prior art. A Notice of Allowance is earnestly solicited. Should an interview or a declaration in support of certain facts recited in the specification be deemed to advance prosecution (over the oath provided prior to prosecution) Applicants respectfully request that the undersigned attorney be contacted.

The present communication responds to the Office Action mailed December 1, 2009. Any necessary extension fee may be deducted from Deposit Account No. 23-0920.

Respectfully submitted,

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